



Our Current Best Thinking About... Professional Learning



Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

Canada

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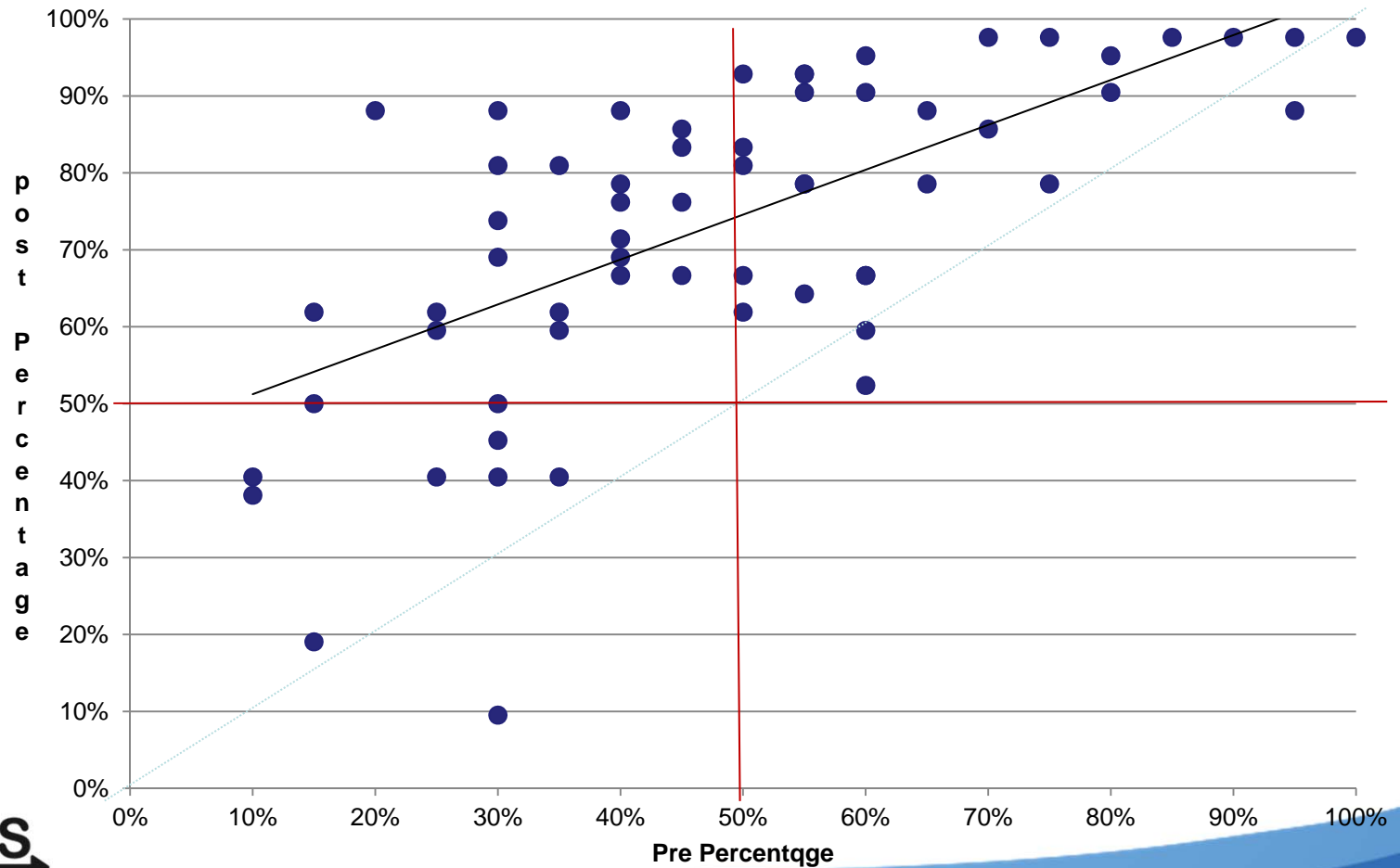
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Student Results

Growth in Achievement



FRACTIONS Digital Paper



Professional Learning

Introduction

→ Professional Learning

- Implementing diagnostic tasks
- Co-planning, implementing and observing lessons
- Analysing student responses
- Sustaining focus on fractions

Fractions(content)

Instructional Decisions

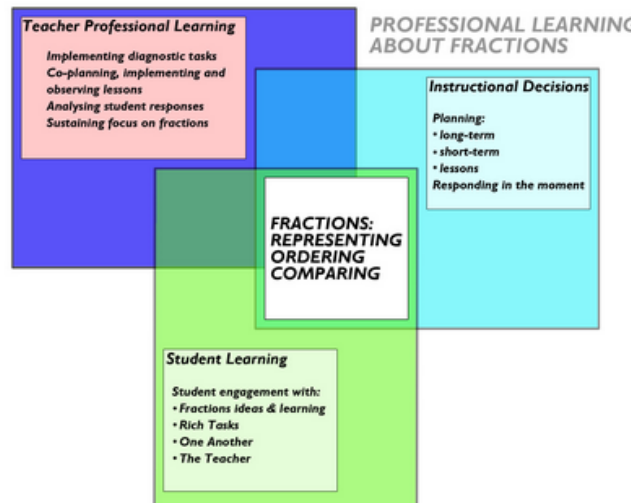
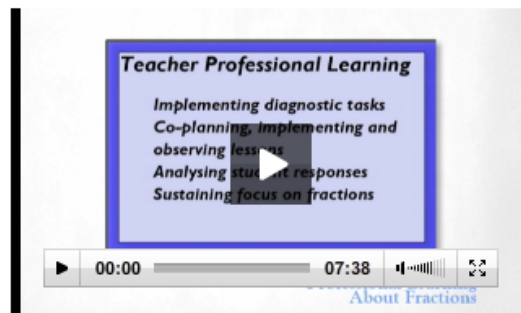
Student Learning

Resources:

Research Story

Professional Learning: Collaborative Action Research In each of the three school boards, teacher-researcher teams engaged in a process of collaborative action research (www.tmerc.ca/digitalpapers/) to explore the teaching and learning of fractions. Collaborative action research is a dynamic form of professional learning that engages educators and researchers in learning together by investigating areas of mutual interest. This occurred over the course of three to five release days (four to seven sessions) and involved a blend of in-class and out-of-class learning over a four-month period.

During the initial session, the teams explored different relationships represented and different actions implied by a fraction (see Math for Teaching Fractions resource). Teams also identified questions and dilemmas for further exploration. An interesting framework for thinking about these dilemmas is provided by the four categories below (Windschitl, 2002). These examples are drawn from the teams in this fractions action research



Math

Powerful Professional Learning

- Think about... a professional learning experience that has been particularly important in supporting improved practice / content knowledge for you.
- Make a quick note about **what** it was and **why** it was so powerful.
- Keep this in mind through the session

Road Map for Plenary 7

We will:

- look back at student work and think about Math Knowledge for Teaching
- think about criteria for high quality PD (and assess Math CAMPPP against these criteria)
- preview outcomes/products from the research

MathGA[↑]NS_→

A decorative graphic at the bottom of the slide consisting of a blue gradient bar that curves upwards from left to right, with a lighter blue layer on top of a darker blue layer.

Holding Conflicting Meanings Simultaneously



Use the pattern blocks to create as many fractions as possible.

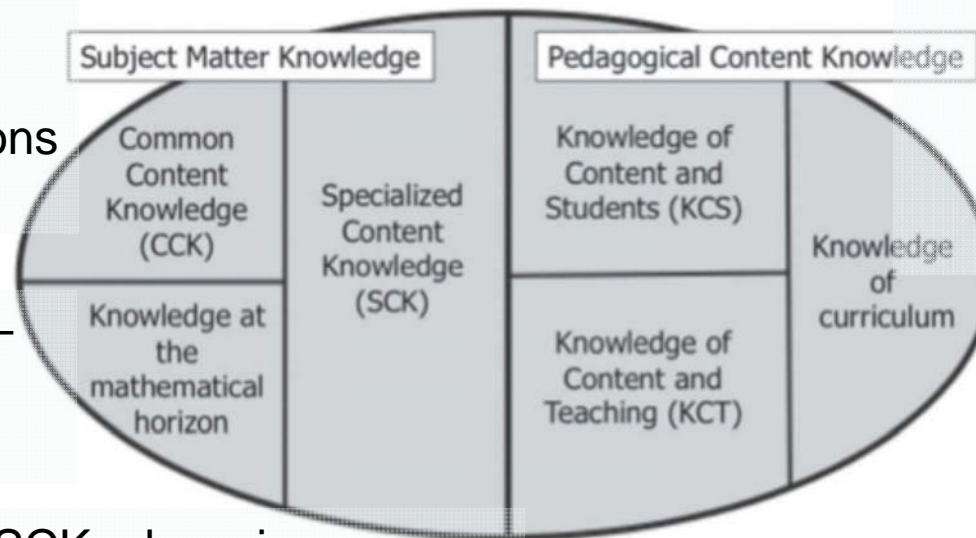
Pictures	Numbers	Words
	$\frac{6}{4}$	<p>A fraction has a numerator and a denominator. The numerator tells you how many pieces are shaded. The denominator tells you how many pieces the whole was cut into.</p> <p>What do the students understand? Are some understandings fragile?</p>
	$\frac{4}{4}$	
	$\frac{2}{4}$	
	$\frac{2}{6}$	
	$\frac{4}{6}$	
	$\frac{4}{6}$	

Math Knowledge for Teaching

Mark Hoover Thames and Deborah Lowenberg Ball

CCK – knowing if an answer is correct, knowledge of definitions and procedures

Horizon Knowledge – ‘mathematical peripheral vision’



SCK – knowing more math than CCK but distinct from PCK

PCK – knowing the most useful ways of representing and formulating the subject in order to make it comprehensible to others

Look back at your PL notes

- What aspects of Math Knowledge for Teaching were strong in your professional learning experience?



Most [math] reforms stop short at the classroom door; all available evidence suggests that classroom practice has changed little in the past 100 years.

Lewis, Perry & Hurd, 2004

[A Deeper Look at Lesson Study](#)

Educational Leadership



- Webster-Wright's 2009 review of over 200 studies on PD and PL found that “professionals learn from experience and that learning is ongoing through active engagement in practice” (p. 723).
- However, the vast majority of educational PD programs have separated the learning opportunities from natural contexts and from practice.

Assumptions

1. Teachers need fixing up
2. Learning out of context will be translated to classroom with ease
3. Others know best what teachers need

Characteristics of Effective Professional Learning

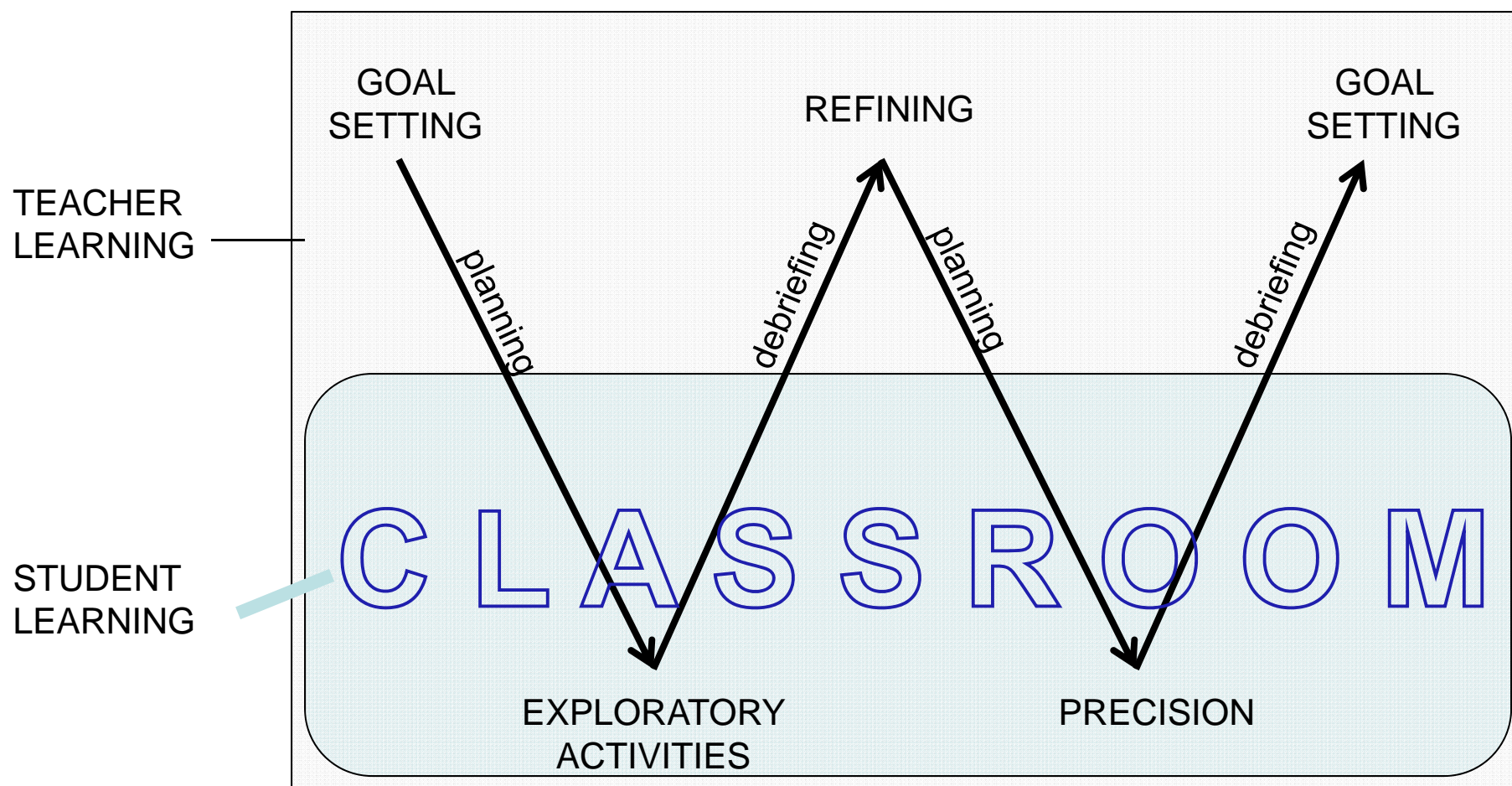
Across multiple studies, there is clear evidence that sustained, iterative, teacher-directed and collaborative models of professional learning support significant gains in mathematics teacher efficacy.

Dr. Cathy Bruce,
Science & Technology Education Group (2012)

Bruce, Esmonde, Ross, Gookey, Beatty (2010)



Explanatory Diagram: The W Effect



Characteristics of high quality professional learning

- Collaborative
- Teacher-directed with facilitation by a knowledgeable other
- Research/evidence-supported
- Sustained
- Classroom embedded
- Goal alignment
- Content rich

Look back at your PL notes

- What *characteristics* of high quality professional learning were evident in your experience?
 - Collaborative
 - Teacher-directed with facilitation by a knowledgeable other
 - Research/evidence-supported
 - Sustained
 - Classroom embedded
 - Goal alignment
 - Content rich

Now Let's Analyse Math CAMPPP

Collaborative
Teacher-directed & fac.
Research-supported
Sustained
Classroom embedded
Goal alignment
Content rich

**Rate on a
scale of 1
to 5**

(1 not really
5 absolutely)

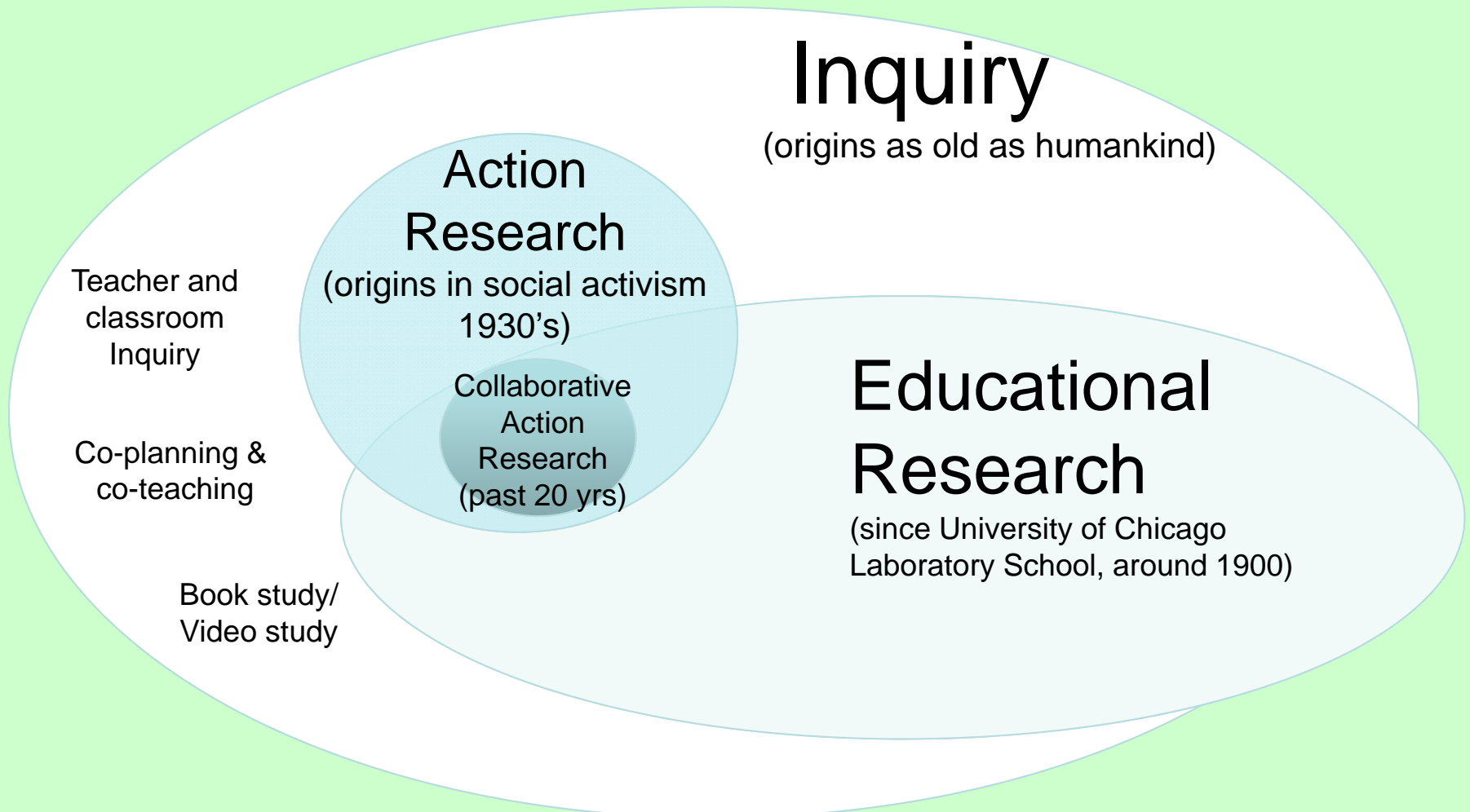
*What has Math
CAMPPP done
to try to
overcome some
of the
challenges of a
week-long PD
experience in
summer
months?*

MathGA:INS



Inquiry? Research? Or Both?

The Broad Context of Education



Examples of high quality mathematics teacher inquiry

- Collaborative inquiry (CILM, MYCI, GAINS)

Often involves co-planning, co-teaching, debriefing, with sustained focus on ‘difficult’ mathematics with the intention of enhancing practice and understandings

Examples of high quality teacher inquiry that are also research

- Collaborative action research (CAR-TLT, KNAER)
- Lesson Study (M4YC)
- CLIPS (design research)

Always involves systematic data collection and analysis, often involves public dissemination of findings (web based, papers, conference presentations, etc), often involves researcher collaboration

Look back at your PL notes

- Did your professional learning experience involve:
 - INQUIRY?
 - RESEARCH?
 - BOTH?
 - NEITHER?



Outcomes of High Quality Math Professional Learning

- Agency (empowerment, ownership and constructive urgency)
- Content learning (close attention to student work, listening and noticing)
- Sustainability (will and capacity to continue)
- Teacher efficacy (high efficacy leads to student increases in efficacy and achievement)

MathGA:NS

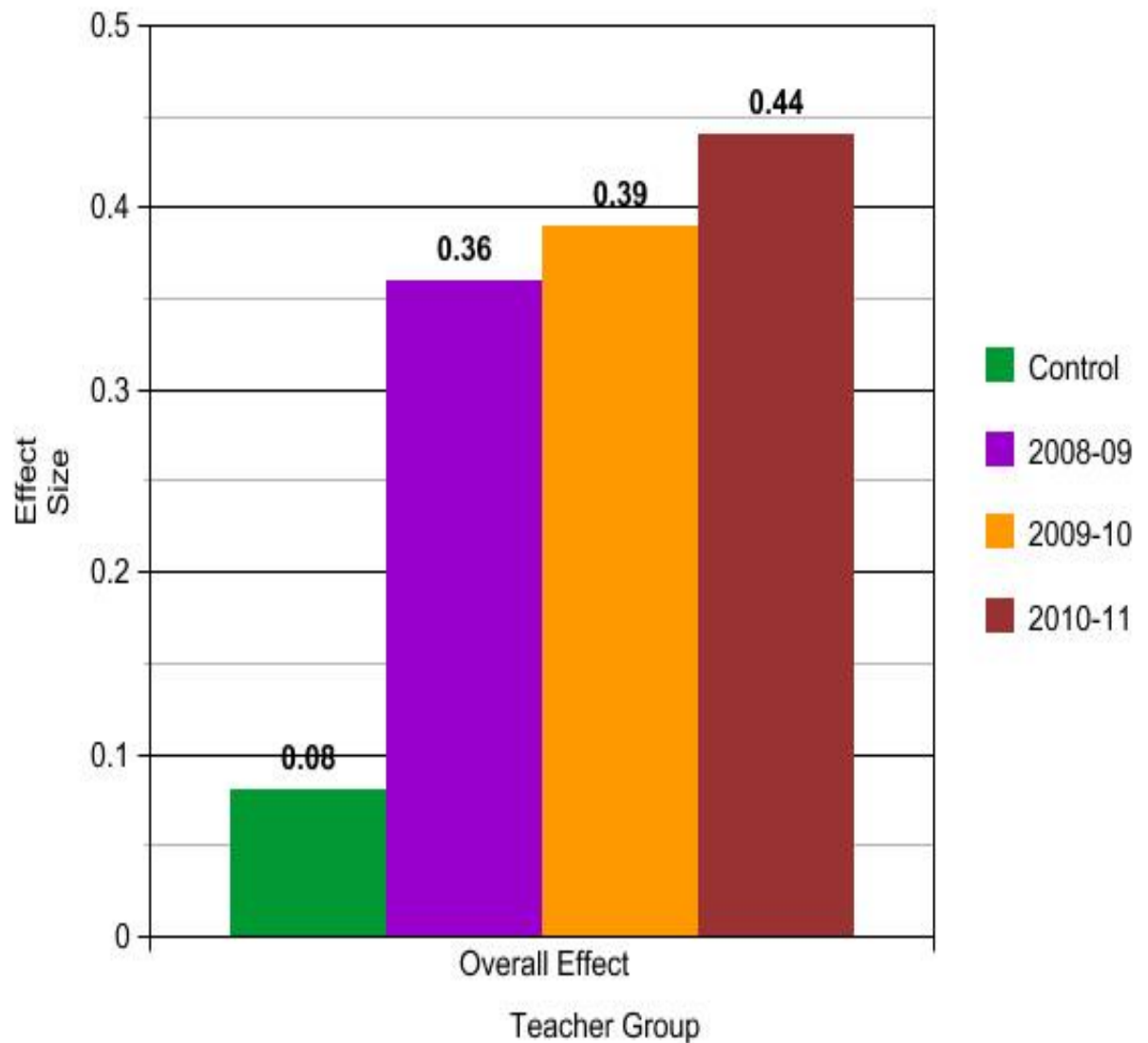


Teacher Efficacy Shifts over Three Years

CIL-M

MathGA:INS

CIL-M Effect Sizes by Year



Research Product: Digital Papers

WHAT IS COLLABORATIVE ACTION RESEARCH?

The process of action research allows educators to:

1. reflect on an issue or a problem relevant to their teaching;
2. to determine what research question(s) they are trying to answer;
3. to implement an intervention designed to address the problem;
4. to collect and analyse data to determine if their intervention is having an effect, and;
5. to implement changes in their practice based on their findings.

One of the distinctive features of action research in comparison to other forms of research is that teacher-researchers aim to do more than simply describe or explain a phenomenon; they aim to improve their practice and student learning (Sagor, 1992). Action research has been shown to be an effective form of teacher professional development that enables teachers to closely examine issues of student learning and teaching practice (Bevino, M.M. & Snodgrass, D.M., 2000;

All headings of diagram are clickable below, to find the related research story, video and transcript.

Collaborative Action Research

Collaboration

Throughout collaborative action research activity, teachers frequently meet to set goals, and to plan and engage in related interventions, data collection, data analysis and report writing. The involvement of researchers and knowledgeable others can range from full membership in the team to a supporting role (e.g., providing resources, assisting with data collection and analysis strategies).

CLASSROOM

Identifying the Problem

- articulating the teacher/learning issue for investigation
- gathering baseline data
- developing research question(s)

Planning Together

- planning interventions that will improve teaching and learning
- consulting current research and accessing human/print resources
- setting timelines

Implementing Plan of Action

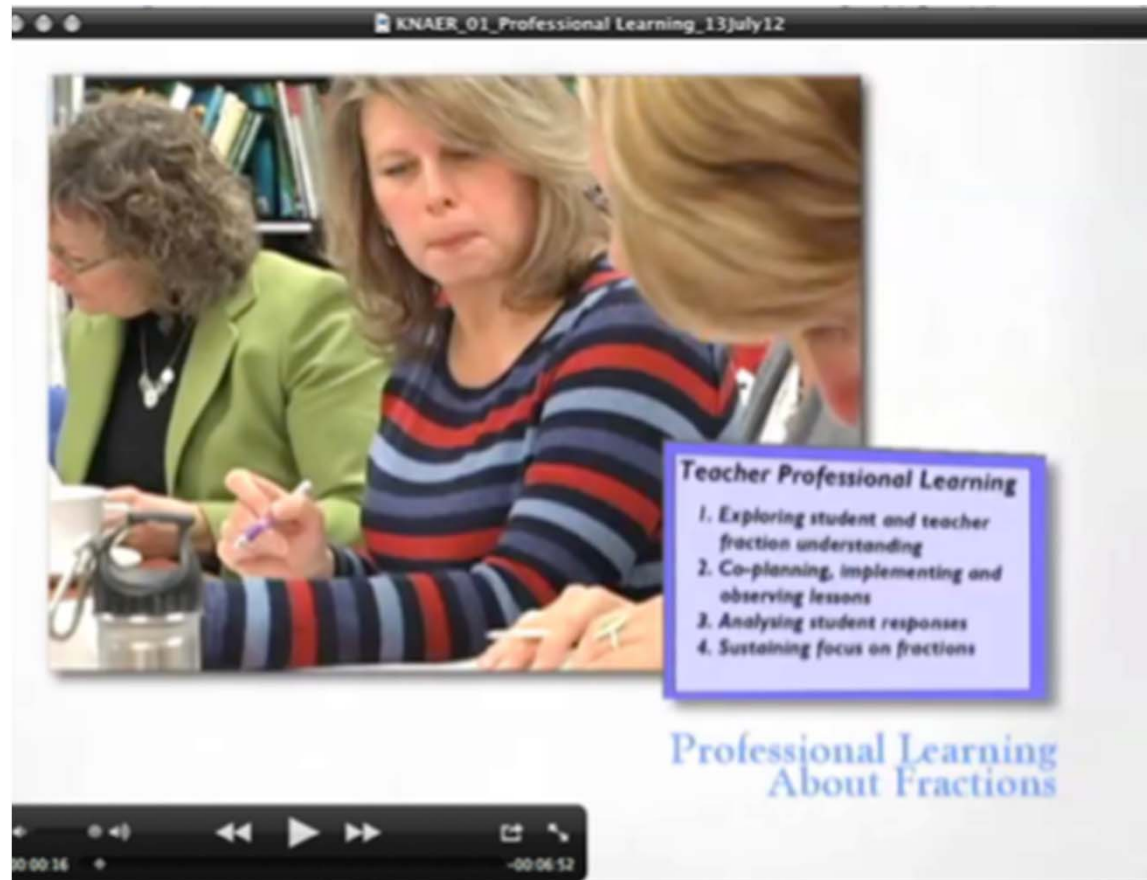
- enacting the plan in the classroom,
- observing, co-teaching, supporting team members
- collecting evidence and reflecting

Evaluating the Interventions

- drawing conclusions from data
- summarizing findings
- writing and sharing reports
- asking new questions

Data Collection
and Analysis

Learning Together



Myths Of Professional Learning

- No budget for release time = no pd
- No planning needed, just show up
- Don't bother with in-between meeting/session activity
- PLC, CIL-M, Inquiry, SIPSA, MYCI are all distinct
- Growing quickly is easy to do
- A coach is a coach (coaches don't need any special training or supports)

QUESTION / ANSWER

- Talk at table about questions, wonderings, insights, implications and inspirations from the week
- Phrase a statement or question that you would like to discuss in the whole group
- We have time to discuss